REMARKS

Claims 1-20 are all the claims presently pending in the application. New claims 10-20 have been added to more completely define the present invention.

Claim 3 stands rejected under §112, second paragraph, as allegedly being incomplete for omitting essential elements. This rejection is respectfully traversed in view of the amendments above. Further, for the Examiner's greater clarity and understanding, Applicant respectfully directs the Examiner's attention to Fig. 5 showing the common electrode 3 parallel to the pixel electrode 8 and the angle formed by the first alignment layer P. Thus, Applicant respectfully requests that this rejection be withdrawn.

It is noted that the claims have been amended solely to more particularly point out Applicant's invention for the Examiner, and not for distinguishing over the prior art, narrowing the claim in view of the prior art, or for statutory requirements directed to patentability.

It is further noted that, notwithstanding any claim amendments made herein, Applicant's intent is to encompass equivalents of all claim elements, even if amended herein or later during prosecution.

Attached hereto is a marked-up version of the changes made to the Specification and/or claims by the current Amendment. The attached pages are captioned "**Version with markings to show changes made**".

Claims 1-7 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Baur et al. (U.S. Patent No. 5,576,867)(hereinafter "Baur").

Claims 8 and 9 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Baur in view of Applicant's Admitted Prior Art.

Claims 8 and 9 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Baur in view of Applicant's Admitted Prior Art, Ohta et al. (U.S. Patent No. 6,532,053 B2)(hereinafter "Ohta").

These rejections are respectfully traversed in the following discussion.

I. THE CLAIMED INVENTION

Applicant's invention, as defined for example in a non-limiting embodiment of independent claim 1 is directed to an active matrix type liquid crystal display device including a TFT substrate having a common wiring and a source/drain wiring formed on a first substrate provided with an insulating film coated with a first alignment layer. An opposite substrate opposes the TFT substrate and includes a second alignment layer formed on a second substrate. A liquid crystal is held between the first alignment layer and the second alignment layer. A common electrode and a pixel electrode, wired in parallel with each other are formed as parts of the common wiring and the source/drain wiring, respectively.

A feature of the present invention is that an angle made between a direction in which the first alignment layer is subjected to an aligning treatment and a direction in which the second alignment layer is subjected to an aligning treatment is set to a value of 0.5 to 4.0 degrees.

With such a combination of exemplary features, by adjusting an initial alignment of the liquid crystal and permitting some light to penetrate the display even during a display of black, a maximum voltage used between the pixel electrode and the common electrode can be decreased, and an increased response of switching the liquid crystal can be obtained while sustaining a high contrast ratio.

The conventional systems, such as those discussed below and in the Background section of the present application, do not have such a structure, and fail to provide for such structure (e.g., see page 18, lines 11-18; page 21, lines 26-27 and page 22, lines 1-12 of the present application).

Such a combination of exemplary features is not taught or suggested by any of the cited references.

II. THE PRIOR ART REJECTIONS

A. Baur et al. Reference

The Examiner asserts that:

> *[regarding claim 1] Baur does not explicitly disclose 0.5 to 4.0 degrees. Baur teaches that an angle made between a direction in which said first alignment layer is subjected to aligning treatment and a direction in which said second alignment layer is subjected to aligning treatment is set to a value of β (col. 8, lines 60-65, and col. 13, lines 39-44) is within 15 degrees of 0 ° (overlaps Applicant's 0.5 to 4.0 degrees and 1.5 to 2.0 degrees) to produce a display with low dependence of image contrast on viewing angle (Abstract).*
>
> *Therefore, optimization of the results effective variable β to comprise Applicant's range of 0.5 to 4.0 degrees and 1.5 to 2.0 degrees would have been obvious to those having ordinary skill in the art of liquid crystals.*

However, Applicant respectfully disagrees.

Firstly, while Baur discloses intitailly-twisted liquid crystal molecules in an in-plane-switching (IPS) liquid crystal display device, Baur does not teach or suggest detailed angular displacement (e.g., a twist angle) between two liquid crystal molecules on opposing substrates for providing a low voltage/high speed device operation with high device contrast.

Baur discloses that "*the liquid crystal layer can be varied such that the twisting degree of the liquid crystal is changed continuously or stepwise for the continuous or stepwise adjustment of varying light transmission degrees in the range between essentially maximum and minimum light transmission*" (e.g., see column 3, lines 41-47 of Baur) (emphasis Applicant's). Thus, in Baur the twist is an all or nothing twist (e.g., maximum or minimum light transmission from an untwisted or twisted liquid crystal, respectively). Thus, in a display of black in Baur, no light penetrates the display. In contrast, in the present invention, light penetrates the display even during a display of black.

Baur also discloses *"the liquid crystal switching element is further developed in such a way that its light transmission has its maximum or minimum amount in the alignment*

in the initial state of the liquid crystal layer and can be varied up to its other extreme value in reoriented states of the liquid crystal layer" (e.g., see column 5, lines 45-50 of Baur). Thus, in Baur an initial state is where a minimum light transmission (e.g., a black display) occurs. Further, Baur indicates a "*twist angle $\beta=0^{o}$*" (e.g., see column 12, line 30 of Baur) in an initial state.

This is much different from the present invention where "*an angle made between a direction in which said first alignment layer is subjected to an aligning treatment and a direction in which said second alignment layer is subjected to a value of 0.5 to 4.0 degrees, in order to decrease a maximum voltage between the pixel electrode and the common electrode, and to increase a response of switching said liquid crystal while a high contrast ratio is sustained*", as defined by independent claim 1. As defined by dependent claim 2, the angle "*is set to a value of 1.5 to 2.0 degrees, in order to decrease the maximum voltage between the pixel electrode and the common electrode and to increase the response of switching said liquid crystal while the high contrast ratio is sustained*".

Thus, with such features, in the invention some light penetrates the display device even during a black display. This feature is important because a maximum voltage used between the pixel electrode and the common electrode can be decreased, and an increased response of switching the liquid crystal can be obtained while sustaining a high contrast ratio. Baur cannot achieve such advantages.

Hence, turning to the clear language of independent claim 1, Baur does not teach or suggest "*[an] active matrix type liquid crystal display device, comprising:*

a thin film transistor (TFT) substrate having a common wiring and a source/drain wiring formed on a first substrate, said first substrate being provided with:

an insulating film covering said common wiring and said source/drain wiring, said insulating film being coated with a first alignment layer;

an opposite substrate, opposing said TFT substrate, having a second alignment layer formed on a second substrate;

a liquid crystal held between said first alignment layer and said second alignment layer; and

a common electrode and a pixel electrode wired in parallel with each other

and being formed as parts of said common wiring and said source/drain wiring, respectively, so that an angle made between a direction in which said first alignment layer is subjected to an aligning treatment and a direction in which said second alignment layer is subjected to an aligning treatment is set to a value of 0.5 to 4.0 degrees, in order to decrease a maximum voltage between the pixel electrode and the common electrode, and to increase a response of switching said liquid crystal while a high contrast ratio is sustained" (emphasis Applicant's).

For the reasons stated above, independent claim 1 is fully patentable over Baur.

Further, dependent claims 2-7 (and new claims 10-20), when taken in combination with claim 1, define additional novel limitations.

Further, with regard to dependent claims 8-9, rejected under 35 U.S.C. 103(a) as being unpatentable over Baur in view of the APA, and with regard to the 35 U.S.C. 103(a) rejection of claims 8-9 as being unpatentable over Baur in view of the APA and Ohta, these claims, when taken in combination with independent claim 1, also define additional novel limitations.

Therefore, these references, either alone or in combination, are much different from the present invention and fail to teach or suggest the claimed invention.

For the reasons stated above, the claimed invention is fully patentable over the cited references.

III. FORMAL MATTERS AND CONCLUSION

In view of the foregoing, Applicant submits that claims 1-20, all the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

The claims have been amended as follows:

1. (Amended) An active matrix type liquid crystal display device, comprising:

a thin film transistor (TFT) [TFT] substrate having a common wiring and a source/drain wiring formed on a first substrate, said first substrate being provided with:

an insulating film covering said common wiring and said source/drain wiring, said insulating film being coated with a first alignment layer;

an opposite substrate, opposing [to] said TFT substrate, having a second alignment layer formed on a second substrate;

a liquid crystal held between said first alignment layer and said second alignment layer; and

a common electrode and a pixel electrode wired in parallel with each other and being formed as parts of said common wiring and said source/drain wiring, respectively, so that an angle made between a direction in which said first alignment layer is subjected to an aligning treatment and a direction in which said second alignment layer is subjected to an aligning treatment is set to a value of 0.5 to 4.0 degrees, in order to decrease a maximum voltage between the pixel electrode and the common electrode, and to increase a response of switching said liquid crystal while a high contrast ratio is sustained.

2. (Amended) The active matrix type liquid crystal display device according to claim 1, wherein said angle made between said direction in which said first alignment layer is subjected to said aligning treatment and said direction in which said second alignment layer is subjected to said aligning treatment is set to a value of 1.5 to 2.0 degrees, in order to decrease the maximum voltage between the pixel electrode and the common electrode and to increase the response of switching said liquid crystal while the high contrast ratio is sustained.

3. (Amended) The active matrix type liquid crystal display device according to claim 1, wherein said direction in which said first alignment layer is subjected to said

aligning treatment has an angle of 5 to 45 degrees with respect to a parallel direction in which said common electrode and said pixel electrode are wired in parallel with each other.